NOTES.

The Physical Society of London announces that the Montefiore Electrotechnic Institute at Liége has instituted a "George Montefiore Levi" prize, which will be awarded every three years, the first award being in 1911. The value of the prize in 1911 will be 20,000 francs (800*l.*). It will be awarded for the best original work presented upon the scientific advance and on the progress of technical applications of electricity in every field. Popular works and simple compilations will be excluded. Works must be in English or French. The jury will consist of ten electrical engineers, five being Belgian and five from other countries. The latest date for receipt is March 31, 1911. Further particulars are obtainable from the secretary, Association des Ingénieurs Electriciens sortis de l'Institut Electrotechnique Montefiore, rue Saint Giles 31, Liége.

The *Morning Post* of August 9 gives prominence to an account of experiments made by Mr. Armbrecht, of Duke Street, on the change of colour of sapphires and other precious stones by the action of radium. The observations are interesting, but the results obtained are by no means new. Nearly three years ago Prof. F. Bordas read before the Paris Academy of Sciences a series of papers in which he described investigations of the effect of radium and other rays upon various forms of crystallised alumina from clear sapphire to brown and opaque corundum and other precious stones. Colourless corundum was transformed into topaz by the action of radium bromide; the depth of colour of natural topazes was increased, and a similar effect was produced with faintly coloured rubies. Short abstracts of Prof. Borda's papers will be found in the seventy-seventh volume of Nature, November, 1908, to April, 1908.

The tenth International Geographical Congress is to be held in Rome during the week beginning October 15, 1911. The congress will be under the patronage of the King of Italy. An organising committee of a representative character is already at work under the presidency of the Marquis Raffaele Cappelli, president of the Italian Geographical Society. Commander Giovanni Roncagli, secretary of the Italian Geographical Society, is acting as general secretary of the committee. The work of the congress will be carried on in eight sections, namely:—(1) mathematical geography; (2) physical geography; (3) biogeography; (4) anthropogeography and ethnography; (5) economic geography; (6) chorography; (7) historical geography and history of geography; (8) methodology and didactics.

We are glad to notice that the useful work of the extension section of the Manchester Microscopical Society is to be continued during the coming winter session. The purpose of this section is to bring scientific knowledge, in a popular form, before societies unable to pay large fees for lectures. In some cases a small fee is charged, but all money thus obtained is devoted to the expenses of the section. The work of lecturing and demonstrating is entirely voluntary and gratuitous on the part of the members of the society. The list of lectures from which secretaries of societies may choose includes some sixty-one subjects and the names of seventeen lecturers. Application for lectures should be made to the honorary secretary of the section, Mr. R. Howarth, 90 George Street, Cheetham Hill, Manchester, who will send a list of the lectures on application.

Mr. Oscar Guttmann, whose death occurred in Brussels last week from injuries received in a taxi-cab collision, was known both as a consulting engineer and a technical chemist. He took frequent part in discussions upon chemical and manufacturing topics at the meetings of the Society of Chemical Industry, and contributed occasional papers. The titles of some of these—*e.g.* "Novelties in the Explosives Industry," "The Manufacture of Smokeless Powder," and "The Chemical Stability of Nitro-compound Explosives"—illustrate the fact that Mr. Guttmann was an authority upon explosives. Other contributions dealt with the manufacture of sulphuric and nitric acids, and the author was the patentee of several devices for use in this and other industrial operations. In an interesting note upon the oldest document in the history of gunpowder, Mr. Guttmann directs attention to the use of this explosive as described in an illuminated MS., "De Officiis Regum," contained in the library of Christ Church, Oxford; and papers upon the early phases and progress of the sulphuric-acid industry also indicate that he was interested in the historical aspects as well as the practice of his professions. As an engineer, Mr. Guttmann had been charged with the design and construction of many large chemical and explosives works at home and abroad. His experience in the two branches of his calling was probably unique, and well qualified him to speak, as he did in an address delivered some three years ago, upon "The Works Chemist as Engineer." Mr. Guttmann was born in 1855, and became naturalised here in 1894. He was a member of the Institution of Civil Engineers, a Fellow of the Chemical Society, a Fellow and sometime vice-president of the Institute of Chemistry, and a member of the council of the Society of Chemical Industry. At the time of his death he was acting as one of the British jurors at the Brussels Exhibition.

The arrangements for Section H (Anthropology) at the forthcoming meeting of the British Association have just been communicated to us. The preliminary programmes of other sections were stated in Nature of July 28. In general ethnography, Mr. E. Torday will describe in Section H some of the tribes encountered in his recent exploration of the Congo area; Mr. Beech will deal with the Sok, of whose language he has made a special study during his residence in Africa; Mr. A. K. Newman, of Wellington, New Zealand, will discuss the origin and racial affinities of the Maori; and Miss Fletcher, of Washington, in an important communication, will deal with certain points connected with exogamy. Miss Fletcher will also contribute an account of recent developments in the study of anthropology in American universities. The archæology of the Mediterranean area will be dealt with by members of the British School at Athens. Dr. T. Ashby, director of the British School at Rome, will describe his excavations at Hagiar Kim and Mnaidra in Malta, and Messrs. Woodward and Ormerod a primitive site in Asia Minor. Prof. W. M. Flinders Petrie will give an account of his excavations at Memphis, and Dr. Seligmann will describe a Neolithic site in the Sudan. An important communication by Prof. Elliot Smith, which summarises the results of ten years' work, will discuss the racial affinities of the Egyptians from the earliest times. Among other archæological papers may be mentioned an account of the work of the Liverpool Committee for Excavation and Research in Wales, by Prof. R. C. Bosanquet, and a report on recent excavations at Caerwent, by Dr. Ashby; a communication from Mr. H. D. Acland will describe prehistoric monuments in the Scilly Isles, and Mr. Alexander Sutherland will give an account of the exploration of a Broch at Watten, Caithness. Friday, September 3, will be devoted to a joint meeting with Section L (Education), in which intelligence tests in school children will be discussed. Among those who have promised papers written from the special point of view of the anthropological section are Dr. Lippmann, of Berlin, Dr. C. S. Myers, of Cambridge, Mr. W. Brown, of King's College, London, Mr. Burt, of the Liverpool Psychological Laboratory, and Mr. J. Gray. Dr. Kerr, medical officer (education) of the London County Council, Dr. W. H. R. Rivers, and others will take part in the discussion.

IN the Long Vacation number of the *Oxford and Cambridge Review* Dr. A. Smythe-Palmer begins an elaborate study of the luck of the horse-shoe, "a veritable fetish, maintaining its reputation for magical potency with unabated influence into the twentieth century." He agrees that the belief in its power is largely based upon the mystical respect for iron, dating from its introduction as an innovation at the close of the Neolithic period; but he also supposes that in shape it is "only a rough-and-ready substitute for the old and long venerated symbol of the crescent," the use of which as a protection against the evil eye and other demoniacal influence is illustrated by numerous examples. He postpones to another article the further question of the mode in which the crescent acquired its magical significance.

IN *Travel and Exploration* for August Mr. W. J. Clutterbuck publishes an interesting and well-illustrated account of the little known Great Lu-Chu Island, or, as the Japanese, who now occupy it, call it, Okinawa, the most important of the Lu-Chu group. He considers the islanders to be a finer race than their conquerors; the shape of the eye is different, being wide open and seldom oblique at the corners, while the women reminded him of southern Europeans. The distinguishing feature of the landscape is the tombs; and at a funeral he noticed the professional female mourners wailing as they marched along enveloped in sackcloth bags, the intention obviously being to conceal them, and thus avoid the unwelcome attentions of the ghost. The corpse is deposited in a tomb for three years, after which the bones are removed, washed, and placed in a highly ornamented earthenware urn, which has a curious resemblance to the house-shaped funeral urns found in other parts of the world, the intention in all cases being to provide a home for the spirit resembling that which the deceased occupied in this life.

Naturen for July and August (Nos. 7 and 8 of vol. xxxiv.) contains a well-illustrated account of the recent eruption of Etna, by Mr. A. Hoel.

WE have to acknowledge the receipt of vol. xxxiii., No. 1, of Notes from the Leyden Museum, which, in addition to other articles, contains a continuation, illustrated by two coloured plates, of Mr. C. J. H. Biermann's account of the Homoptera of the Dutch East Indies.

THE amphipod crustaceans of Bermuda and the West Indies, according to a memoir of 115 pages by Dr. W. B. Kunkel, published in vol. xvi. of the Transactions of the Connecticut Academy of Arts and Sciences, have apparently received but scant attention at the hands of naturalists. Recent collecting in Bermuda—by Prof. Verrill and others—has enabled the author to put matters on a very different footing. The most striking peculiarity of the amphipod fauna of Bermuda is its close affinity to that of the Mediterranean. Of forty-five Bermuda species, nineteen, or possibly twenty, are common to the Mediterranean. Eighteen out of the forty-five are peculiar to Bermuda, and only seven which are not endemic are unknown in the Mediterranean. In contrast to this abundance of European types, the presence of only nine species common to South and Central America is remarkable, especially in view of the fact that 93 per cent. of Bermuda decapods have been recorded from the West Indies and Florida Keys. "This paucity of forms from Central and South America probably has little significance, however, and is due simply to the small amount of collecting of Crustacea from these waters."

THE difficult, if not indeed unanswerable, question as to the limitations of species and races is again raised by Mr. G. Dalgliesh in the case of the yellow-necked field-mouse. In this instance the writer maintains that this mouse ought to be regarded as specifically distinct from the ordinary long-tailed field-mouse (*Mus sylvaticus*) under the name of *M. flavicollis*, basing his arguments, not only on the physical differences between the two forms, but likewise on their distribution and their divergence in habits and disposition. It may be remarked in this connection that naturalists are by no means in accord as to the proper name for the yellow-necked form. Mr. Dalgliesh uses Melchior's *flavicollis*; but in his recently published "Faune des Mammifères d'Europe" Dr. Trouessart regards this term as a synonym of the true *sylvaticus*, and employs *wintoni* for the British form. On the other hand, Mr. Millais, as quoted by Mr. Dalgliesh, regards the British yellow-neck as a distinct local form of the Continental *flavicollis*, under the name of *M. f. wintoni*. Mr. Pycraft, again, in his "Guide to the British Vertebrates in the British Museum (Natural History)," alludes to the one form as *Apodemus sylvaticus* and to the other as *A. flavicollis*. The question of species or race is of infinitesimal importance, but the eccentricities in nomenclature are perplexing.

MUCH interest attaches to an article by Dr. Felix Oswald in the July number of *Science Progress* on the area termed by Dr. Sven Hedin the Trans-Himalaya, an area bounded on the north by the chain of lakes first discovered by the explorer Nain Sing, and on the south by the Indus-Tsan-po valleys. Throughout the area the trend of the mountains, as shown by a map, is quite distinct from the north-west and south-east direction of the Himalaya proper, this alone being held sufficient to justify Dr. Hedin's proposal of the term Trans-Himalaya. There is, however, much more than this, for, in the author's opinion, the Trans-Himalaya represents a block of ancient rocks thrown into folds at a very remote epoch, but at the date of the folding of the Tibetan plateau so intractable that they yielded to mountain-making force by first becoming fractured and then uptilted. If this be granted, "it follows that the natural continuation of the parallel ranges of the block now lies sunk beneath the Brahmaputra Valley, at the base of the great fault-scarp, to which the river flows in parallel alignment. Accordingly, this valley must be of the nature of a rift-valley or sunken trench, especially since the opposite (southern) wall of the valley lies parallel to the northern wall, and in like manner possesses an average height of 23,000 feet." In conclusion, Dr. Oswald traces a curious parallelism—which he believes to be more than accidental—between the structure of the Arabian-Armenian-Caucasian area on the one hand, and the Indian, Tian Shan, and Siberian region on the other, each having an anterior and posterior table-land separated by three systems of "waves."

THE ninety-fifth volume of the *Zeitschrift für wissenschaftliche Zoologie* is completed by the number published on June 21. The papers which this volume contains deal, as usual, with a great variety of subjects, from pure descriptive anatomy, as in the case of the elaborate memoir by Albert Bauer on the musculature of the water-beetle, *Dytiscus marginalis*, to the most minute investigations in cytology and protozoology. Heinrich Stauffacher's "Beiträge zur Kenntniss der Kernstrukturen" affords a beautiful example of the results to be obtained by modern cytological methods. Its chief interest, perhaps, lies in the demonstration of "nuclear bridges" (Kernbrücken) in the form of threads which connect the protoplasm of the nucleus with that of the cell body. W. Knoll, in the next memoir, deals critically with the question of the existence of such connections between karyoplasm and cytoplasm, and demonstrates their existence in the leucocytes of the human body. Amongst the other papers we have only space to mention the first part of C. Janicki's studies on parasitic flagellates, dealing with two species of Lophomonas found in the cockroach. The application of modern technique to the investigation of the Protozoa, as we hardly need point out, marks the commencement of a new era in the study of these organisms, revealing complexities of structure previously unsuspected, as the plates illustrating the remarkable genus dealt with by Janicki abundantly testify.

IN the *Bio-chemical Journal* for June (vol. v., No. 4) Prof. Benjamin Moore and Dr. Stenhouse Williams detail experiments on the effect of an increased percentage of oxygen on the vitality and growth of bacteria. Of twenty-six organisms tested, two may be termed oxyphobic. These are the tubercle bacillus, which is not only arrested in growth, but is actually killed by a high percentage of oxygen, and the plague bacillus, which, though not killed, uniformly refused to grow in percentages of oxygen from 60 to 91. The staphylococcic group was also adversely affected, but the remainder, including the typhoid, dysentery, glanders, diphtheria, anthrax, and cholera organisms, was unaffected.

IN the Bulletin of the Johns Hopkins Hospital for July (xxi., No. 232) Dr. John L. Todd contributes an excellent review of the recent advances in our knowledge of tropical diseases. He summarises the most striking additions to our knowledge of tropical medicine during 1909 as being (1) the discovery of infantile kala-azar in northern Africa; (2) the discovery of a new human trypanosome in South America; (3) the researches which have made it almost certain that the parasite of sleeping sickness undergoes a developmental cycle in the tsetse-fly which conveys it; and (4) the transmission of typhus fever to monkeys by the bites of body lice.

IMPORTANT information with regard to the thyroid body and related structures is supplied in a paper by Mr. F. D. Thompson, just published in the Phil. Trans. A thyroid, thymus, and post-branchial body are developed in the gill-slits of elasmobranch fishes; but parathyroid and carotid glandules have not been observed. In teleostomous fishes, on the other hand, the only organs of this nature are the thyroid and thymus; but parathyroids make their appearance in amphibians and reptiles, in the former of which the post-branchial body is retained. In these groups the structure of the various glands of the thyroid type differs considerably; but in mammals such structural differences tend to disappear, and in certain circumstances the parathyroids may develop colloid vesicles, and thus become practically identical with the thyroid. The thyroid and parathyroids may accordingly be regarded as structures of diverse embryological origin, which remain distinct in lower vertebrates, but in mammals become intimately related and constitute a single apparatus.

So closely are fungi and bacteria often associated in their destructive action on plant tissues, that it is extremely difficult to determine which organism is taking the lead. Some botanists, including De Bary, Hartig, and A. Fischer, have expressed themselves very sceptical as to the possibility of bacteria penetrating living plant tissues; others, notably E. F. Smith in the United States and Prof. M. C. Potter, have offered results of experiments as proof that bacteria do pass into the living plant and penetrate through cell walls. The subject is fairly discussed by Prof. Potter in his presidential address delivered before the British Mycological Society, and published in their Transactions. In addition to other arguments, the author refers to his experiments upon the white rot of turnips, when the bacterium *Pseudomonas destructans* was not only isolated and re-inoculated on the host, but it was demonstrated that oxalic acid was produced by the bacterium, which acts as a toxin in plasmolysing and killing the protoplasm; he also states that subsequently penetration of the cell wall by bacteria was observed.

WE have received from Mr. E. Reinders a copy of his paper on the "Sap-raising Forces in Living Wood," read before the Royal Academy of Sciences of Amsterdam, January 29. After a short discussion of the available evidence on the problem of the ascent of water in trees, he gives an account of his own experiments. His results are of interest, as supporting the view that water is raised by a pumping action of the living elements of the wood (a theory generally connected with the name of Godlewski), and the detailed description of Mr. Reinders's work will be expected with interest. Mr. Reinders proceeds from the fact "that manometers placed at different heights up the trunk behave quite independently of one another. Sometimes one shows a lower pressure, sometimes the other." This irregularity is assumed by Reinders to be due to the pumping action of the living elements in the wood, and he proceeds to test his view by killing the stem either by steam or by an induction shock. He found that "as soon as the trunk was dead the difference of pressure followed the same rule as would be expected to apply to a glass tube." In one striking case the stem was not killed, but so seriously injured that five days elapsed before the behaviour of the manometers became once more "as irregular as in living trees." It should be added that Mr. Reinders assumes that in dead trunks which can no longer act as pumps, water ascends "through other causes, *e.g.* with the help of cohesion."

IN the June number of the *Agricultural Journal of the Cape of Good Hope* is an article on the dried fruit and raisin industry recently established in Cape Colony. Although no great amount of produce has yet been raised it appears that the local conditions are suitable for success, and when certain improvements are effected there is the prospect of supplying the needs of the colony and even perhaps of establishing an export trade.

WE have received from the University of Wisconsin Agricultural Experiment Station several "Research Bulletins" devoted to subjects of scientific interest. A study was made of the physiological effect on the cow of the milking machine which is now threatening to supplant the cowman and the milkmaid. No bad effects on the general health of the animal or the state of the udder could be found, and for an ordinary dairy herd the machine worked very well. Whether it would give equal results in a high-class herd is not certain; but here the economic problem is rather different. There still remain, however, a number of details in which improvements must be effected before the machine can be widely used. In another bulletin a description is given of an organism producing acidity in milk which appears to be closely related to *B. bulgaricus,* the characteristic organism of Yogurt, and to be widely distributed. Messrs. Hart, McCullum, and Humphrey continue their work on the functions of the mineral constituents of foods on metabolism in the animal, and show that the skeletal tissues can, if necessary, make good any deficiency of calcium and phosphorus in the ration. A low phosphorus intake was accompanied by a high calcium output in the urine.

The use of more exact statistical methods in the investigation of agricultural problems has already led to interesting results, and is likely to prove of great benefit. Mr. Vigor recently discussed the relation between the reduction in area of wheat in England and the increased yield; his paper is published in the Journal of the Royal Statistical Society (part iv.). The reduction of the wheat area has been accompanied by a rise of the yield per acre in England as a whole, and improvements of the yield often appear to be greatest in those countries where the proportionate reductions of area have been greatest. Counties of low yields do not, however, appear to have been specially selected for a reduction of area. The yields of the various counties have shown a slight tendency to level up. By applying somewhat similar methods, H. Arctowski has, in Bulletin No. 7 of the American Geographical Society, mapped out the variations in the harvest in the United States during the decade 1891–1900. In general, very bad years in one region of the globe are years of excellent yield in another region, but the centres of compensation are not always found in the same regions nor is the compensation always exact; otherwise the supply would be constant.

The Scotch Education Department has issued in connection with the Royal Scottish Museum, Edinburgh, two useful guide-books, "An Introduction to Petrography and Guide to the Collections of Rocks," published in 1909, and "A Guide to the Scottish Mineral Collection," published in 1910. Both are from the pen of Dr. S. J. Shand, who is in charge of the geological department of the museum, and both are sold for the modest sum of one penny. The guides have been specially compiled from the point of view of Scottish minerals and rocks, and are written in simple and, so far as possible, untechnical language, so as to appeal to the ordinary visitor unversed in these subjects. A few pages of the rock guide are devoted to a description of the collection of rocks of the Christiania district, which has, owing to Prof. Brögger's exhaustive studies, become classical in the science of petrology. Copious indices add to the usefulness of the books.

The Tanami goldfield in Central Australia was discovered in the year 1900, but its development has been delayed by the scarcity of water and its situation in a remote part of the continent on the eastern frontier of Westralia. The general geographical and geological conditions of the goldfield are described in a short report by Mr. H. Y. L. Brown, the Government geologist of South Australia. (Government Geologist's Report on the Tanami Gold Country, Northern Territory of South Australia. Pp. 12; three maps. Adelaide: 1909.) Mr. Brown shows that the oldest rocks of the district belong to a series of slates, quartzites, and schists which, though pre-Cambrian, are stratified sediments. They have been invaded by plutonic rocks, including diorite and felsite, and covered by a series of limestones and dolomites, which he identifies as Lower Cambrian, and by quartzites, sandstones, and boulder beds, which he regards as probably Permo-carboniferous. There are widespread volcanic rocks, mainly basalts and volcanic ashes, which Mr. Brown assigns to eruptions ranging from Mesozoic to Cainozoic. His description of extinct craters suggests that some of the eruptions are of recent age. The gold occurs in lodes numerous in the pre-Cambrian sediments near the junction with the intrusive diorites, and also in "lode formations" in the igneous rocks. The mines are at present little more than prospecting shafts. The gold in the quartz is coarse, and where it occurs in the altered igneous rocks it is finely diffused. The widespread limestones and basalts produce a rich soil, and if adequate water can be obtained, the district will be valuable for pastoral purposes, while Mr. Brown regards the gold discoveries as promising and important.

In a short article in the *Physikalische Zeitschrift* for August 1, Messrs. R. A. Houstoun and J. Logie direct attention to the fact that aqueous solutions of ferrous ammonium sulphate form a good filter for stopping heat rays. Alum solutions are, it is now known, no better than water in this respect. A glass cell, of inside thickness 3 cm., filled with a solution of ferrous ammonium sulphate, transmitted 75 per cent. of the light and 5·1 per cent. of the total radiation from a carbon glow-lamp; when filled with water it transmitted 90 per cent. of the light and 11·1 per cent. of the total radiation. The light, it should be stated, forms about 3 per cent. of the total radiation.

The *Physikalische Zeitschrift* reproduces in its number for July 15 a communication made recently by Dr. F. Ehrenhaft to the Academy of Sciences of Vienna on an ultra-microscopic method of measuring the electric charges carried by small particles. The particles investigated were of the noble metals, and were produced by means of an electric arc between electrodes of the metal concerned. The air containing the particles in suspension was drawn into an ebonite enclosure in front of the objective of a Zeiss ultra-microscope placed with its axis horizontal, and illuminated from the side in the usual way. The enclosure contained the plates of a small condenser the axis of which was adjusted to be vertical. With the condenser uncharged, the time of fall of a particle through a measured distance in the field of view was observed; the condenser was then charged in such a direction that the particle ascended, and its speed again observed. Finally, the condenser was short-circuited, and the speed of fall again determined. Assuming that Stokes's formula for the resistance to the motion of a sphere in a viscous fluid holds for the particles investigated, the magnitudes of the electric charges carried by the particles come out smaller than 1×10^{-10} electrostatic units, a conclusion which does not accord with the view so generally held at present that the "atom" of electricity is $4{\cdot}6 \times 10^{-10}$ electrostatic units.

The "Metzograph Grained Screen" takes the place of the ordinary cross-lined screen in photo-block making, and differs from it in giving an irregular grain and in requiring a shorter exposure. It does not produce its effect by stopping a large proportion of the light, as the cross-lined screen does, but by the lens-like action of the irregularities of its surface. It is produced by obtaining by sublimation a reticulated film on the surface of a glass plate, and then etching with hydrofluoric acid, the film acting as a resist. The screen was invented by Mr. James Wheeler about thirteen years ago, and as the little differences in its manipulation, as compared with the lined screen, appear to have hindered its adoption in those cases where it offers especial advantages, Messrs. Penrose and Co., of 109 Farringdon Road, have just issued a booklet of instructions for its use. The pamphlet includes specimens of each of the ten degrees of fineness, suitable for work from large posters to the finest photogravure. The impressions show what fine results the screen yields, the chief peculiarity being the entire absence of the regular grain that some persons find so objectionable in the usual type of photo-block.

The report of the senior analyst, Cape of Good Hope Government Laboratories, for the year 1909, contains some interesting reading. About three-fourths of the samples examined (3154 out of 3820) consisted of foodstuffs, beverages, and drugs; these call for no special comment except, perhaps, to question the utility of giving much analytical detail in a publication of this kind. The remainder of the samples reflect the character of the country: they are mainly mineral, agricultural, and toxicological articles. Gold assays are the most numerous amongst the mineral analyses, which include also the testing of coals, supposed platiniferous rocks, copper, iron, manganese, and tin ores, and supposed diamonds. Amongst the toxicological cases, one is especially noteworthy. A native woman had been poisoned with an indigenous bulb administered by a Kaffir "doctor," and it took four months to obtain proof that such bulbs (Hæmanthus) could produce the fatal effects in question. This delay was due to lack of knowledge concerning the local poisons, and the senior analyst urges that a research into the properties of the vegetable drugs and poisons of South Africa should be carried out systematically. At present, any such investigations are merely casual and incidental upon legal proceedings. The production of barley suitable for brewing purposes, and an investigation into the agricultural soils of the colony, are some of the other topics mentioned in a report which everywhere bears evidence of useful activity.

We learn from the *Engineer* for August 5 that the first of the large caissons for the new foundations of the Quebec Bridge was launched at the works yard, near the bridge site, on July 8. This particular caisson is for the new north pier, and will be situated clear of the old pier, its centre being 57 feet further out from the shore. The new centre line of the bridge has been decided upon 15 feet west, or upstream, from the old centre, this alteration enabling the new superstructure to be 30 feet wider than the old. The new south pier will be 15 feet nearer the river centre, consequently the span will be 1758 feet instead of 1800 feet, as before. The rebuilding of the south pier presents many more difficulties than the north. The new south pier will occupy very nearly the site of the old, necessitating the placing of a caisson at the side of the existing one, and another across the end of the pair. Upon the three a new caisson, 79 feet by 180 feet, will be sunk. It is thought that the latter will be the largest ever constructed for this class of work.

A description of the hydroplane *Miranda IV.*, built by Sir John Thornycroft, appears in *Engineering* for August 5. This boat is 26 feet long by 6 feet beam, and 2 feet 6 inches deep. In general outline she approaches very much to the shape of an ordinary boat, but the bottom is specially adapted to make her skim at high speeds. This arrangement gets over the difficulties of the original type of hydroplane, for at moderate speeds she goes through the water in a similar manner to an ordinary boat, and the variation of form necessary to make her skim is so small as not materially to affect her performance. When skimming, a small portion of the length amidships carries the weight, the rest of the boat being entirely clear of the water with the exception of a small length aft, which may have enough weight on it to make the boat stable longitudinally. The greater part of the bottom being thus clear of the water, frictional and other resistances are very greatly reduced. It is remarkable how small the disturbance of the water is considering the speed of the boat, which has exceeded 31 knots under somewhat unfavourable conditions. If the speed development of hydroplanes is found to follow the same law as that of torpedo boats, a hydroplane 52 feet long, 10 tons displacement, with a brake-horse-power of 950, should do 45 knots, and a speed of 60 knots might be obtained from a boat 110 feet long. Such development depends on the progress made with petrol motors of large power, and in a matter of this kind it is not wise to be in too great a hurry.

Mr. Werner Laurie will publish shortly "The Black Bear," by Mr. W. H. Wright, author of "The Grizzly Bear."

Messrs. D. Appleton and Company are publishing immediately a new work entitled "Up the Orinoco and down the Magdalena," in which Mr. H. J. Mozans relates his travels to South American countries and across the Andes.

OUR ASTRONOMICAL COLUMN.

Photographs of Nebulæ.—Among the recent additions to the Royal Astronomical Society's collection of celestial objects are three of surpassing excellence taken by Dr. Ritchey with the new 60-inch reflector at Mount Wilson. The objects are the spiral nebulæ M. 51, M. 81, and M. 101, and these photographs bring out remarkable details as to their structure; the spirals of M. 101 are shown as broken up into soft, star-like condensations, like nebulous stars.

Dr. Ritchey has made a number of important improvements to his camera, and now uses two guiding eye-pieces, one on each side of the centre, in order to allow for any possible slight rotation of the field; a power of 800 is employed in the eye-piece. By using a smaller plate, only 3½ inches square, the guiding star comes much nearer the centre of the field, that is, nearer the object under observation. He also has the plate carrier easily detachable, so that it may be taken off, and accurately replaced, *every half-hour* or so, to allow of re-focussing; this is done by using a knife-edge in the focal plane, and by such frequent re-focussing he keeps in the true focal plane within 1 or 1½ thousandths of an inch. With an exposure of 7·5 hours, the photograph of M. 101 shows practically perfect star images, of which the smallest are only 1·6 seconds of arc in diameter, and Dr. Ritchey states that an exposure of 3½ hours on the globular cluster M. 3 shows tens of thousands of star images which are only 1·15 seconds in diameter.

Photographs of parts of the Great Andromeda nebula, the Ring nebula in Lyra, and the Crab nebula were also sent, and are strikingly beautiful; much new light is likely to be thrown on the structure of these objects from the careful study of the negatives. A preliminary study shows that while in some (*e.g.* M. 101) the spirals are broken up into "nebulous stars," in others (*e.g.* M. 64, Comæ Berenices) they are apparently smooth; in M. 101 more than 1000 of these condensations have been counted. In the Andromeda nebula the central parts are apparently regular, with complicated dark rifts, and the spiral extends practically to the nucleus, but the outer branches contain great numbers of the "nebulous stars" (Monthly Notices R.A.S., vol. lxx., No. 8).

Halley's Comet.—The Journal of the Royal Astronomical Society of Canada (vol. iv., No. 3) contains reproductions of fifteen photographs of Halley's comet, taken at the Dominion Observatory, Ottawa, by Mr. Motherwell, during the period May 3 to June 9, also reproductions from two photographs taken by Prof. Barnard, at Yerkes,